

1 **Abstract**

2 Watermark and pattern detection can be improved by compensating for artifacts
3 introduced into an image by a printer and/or scanner through which the image has
4 passed. With the present invention, prior to watermark or pattern detection, the image is
5 filtered or modified to compensate for artifacts introduced by the printer and/or scanner.
6 Some scanners automatically compensate for artifacts introduced by the scanner by
7 using a calibrated tone map. The automatic compensation provides an image from
8 which, a watermark can be easily read. However, generally the user is provided with an
9 interface which can be used to change certain parameters such contrast and intensity.
10 The changes made by the user change the compensation (i.e. the tone map) applied to
11 the image. If the user changes the compensation applied to the image it can affect the
12 ability to read the watermark. The present invention provides a system which reverses
13 any compensation introduced by the user so that the watermark or pattern can be more
14 easily read. In another embodiment the invention takes into consideration that some
15 printers and scanners have transfer functions which differ in the "x" and "y" directions.
16 Thus the compensation introduced by the filter can differ in the "x" and "y" directions. In
17 one embodiment, a scanner introduces aliasing frequencies into an image. Detection is
18 improved by selectively removing certain frequencies. In another embodiment, the filter
19 compensates for fact that the scanner frequency response falls off at higher frequencies.